

What is claimed is:

- 1 1. An optical disc comprising a title area and a manager
2 area, wherein
3 the title area stores a plurality of video
4 titles, each of which is a video production and which
5 each include route information and a plurality of pieces
6 of video information retrieved according to the route
7 information,
8 wherein there are three types of video titles
9 which are a first type, a second type, and a third type,
10 with video titles of the first type being retrieved
11 according to only a piece of route information, video
12 titles of the second type being retrieved according to a
13 plurality of pieces of route information and branch
14 information, and video titles of the third type being
15 retrieved according to a plurality of pieces of route
16 information without the branch information,
17 and wherein the manager area includes:
18 an address management information area for
19 storing a plurality of pieces of address management
20 information which each include an address of one of the
21 plurality of video
22 titles; and
23 a playback type information area for storing a
24 plurality of pieces of playback type information, wherein
25 the plurality of pieces of playback type information
26 correspond to the plurality of pieces of address
27 management information, each of the plurality of pieces
28 of playback type information including a first flag and a
29 second flag, of which the first flag indicates whether a
30 corresponding video title is retrieved according to a

31 piece of route information or according to a plurality of
 32 pieces of route information, and the second flag
 33 indicates whether the route information of the
 34 corresponding video title includes the branch
 35 information.

1 2. The optical disc of Claim 1, wherein
 2 each of the plurality of pieces of playback type
 3 information indicates that a disc reproduction apparatus
 4 can execute AV functioning for a corresponding video
 5 title if the corresponding video title is at least in one
 6 of a first case and a second case, wherein in the first
 7 case, the first flag indicates that the corresponding
 8 video title is retrieved according to only one piece of
 9 route information, and in the second case, the second
 10 flag indicates that the route information of the
 11 corresponding video title does not include the branch
 12 information, and

13 wherein the AV functioning at least includes a
 14 search function for allowing the disc reproduction
 15 apparatus to search and reproduce an arbitrary portion of
 16 a video title and a feedback function for allowing the
 17 disc reproduction apparatus to monitor and display a
 18 reproduction elapsed time.

1 3. The optical disc of Claim 2, wherein
 2 the playback type information includes a third
 3 flag which indicates whether all pieces of route
 4 information of a corresponding video title are of a
 5 normal playback type, wherein the normal playback type is
 6 a type in which the plurality of pieces of video
 7 information specified by the route information are
 8 sequentially reproduced in a predetermined order.

1 4. The optical disc of Claim 2, wherein the playback
2 type information includes a fourth flag which indicates
3 whether all pieces of route information of a
4 corresponding video title are of a branch-in-title type,
5 wherein the branch-in-title type is a type in which a
6 current video title does not branch to another video
7 title.

1 5. The optical disc of Claim 2, wherein the playback
2 type information includes a fifth flag which indicates
3 whether all pieces of route information of a
4 corresponding video title are of a branch destination
5 auto selection type, wherein the branch destination auto
6 selection type is a type in which a default branch
7 destination is specified for a case when no branch
8 destination has been selected by an operator.

1 6. The optical disc of Claim 2,
2 wherein each of the plurality of pieces of video
3 information includes a plurality of video blocks, wherein
4 each of the plurality of video blocks includes video data
5 and unit time management information, wherein the video
6 data is compressed data of a certain unit time and the
7 unit time management information controls a reproduction
8 during the certain unit time, and

9 wherein the title area includes a plurality of
10 index number tables each including a plurality of index
11 numbers and search destination information that indicates
12 addresses of video blocks respectively corresponding to
13 the plurality of index numbers, wherein the plurality of
14 index number tables correspond to a plurality of pieces
15 of route information of the first type and the second
16 type.

1 7. The optical disc of Claim 6,
2 wherein the plurality of video blocks are
3 arranged in an order of reproduction in a direction of
4 rotation of the optical disc, and
5 wherein the title area further includes a
6 plurality of time map tables including information
7 indicating a relation between the plurality of video
8 blocks and a plurality of time codes, wherein a time code
9 is displayed by the disc reproduction apparatus when a
10 corresponding video block is reproduced, wherein the
11 plurality of time map tables correspond to a plurality of
12 pieces of route information of the first type and the
13 second type.

1 8. The optical disc of Claim 2, wherein the manager area
2 and the title area are formed on a surface of an
3 information layer, wherein the information layer is
4 formed between a first transparent substrate and a second
5 transparent substrate, each of the first transparent
6 substrate and the second transparent substrate having a
7 thickness range of 0.5mm to 0.7mm.

1 9. A disc reproduction apparatus for reproducing an
2 optical disc, the optical disc comprising a title area
3 and a manager area, wherein the title area stores a
4 plurality of video titles, each of which is a video
5 production and which each include route information and a
6 plurality of pieces of video information retrieved
7 according to the route information, wherein the manager
8 area includes: an address management information area for
9 storing a plurality of pieces of address management
10 information each of which includes an address of one of
11 the plurality of video titles; and a playback type

information area for storing a plurality of pieces of playback type information, wherein the plurality of pieces of playback type information correspond to the plurality of pieces of address management information, wherein each of the plurality of pieces of playback type information includes a first flag and a second flag, the first flag indicating whether a corresponding video title is retrieved according to only one piece of route information or according to a plurality of pieces of route information, and the second flag indicating whether the route information of the corresponding video title includes the branch information, wherein each of the plurality of pieces of playback type information indicates that the disc reproduction apparatus can execute AV functioning in a corresponding video title if the corresponding video title is at least in one of a first case and a second case, wherein in the first case, the first flag indicates that the corresponding video title is retrieved according to one piece of route information, wherein in the second case, the second flag indicates that the route information of the corresponding video title does not include any branch information, wherein the AV functioning at least includes a search function for allowing the disc reproduction apparatus to search and reproduce an arbitrary portion of the video title and a feedback function for allowing the disc reproduction apparatus to monitor and display a reproduction elapsed time,

the disc reproduction apparatus comprising:

an optical pickup for optically reading data from the optical disc;


```

9  manager buffer corresponding to the video title selected
10 by the operator; and

```

11 a condition comparing unit for comparing a
12 combination of flag values in the piece of playback type
13 information fetched by the playback type information
14 fetching unit with the combination of flag values in the
15 search condition table,

16 wherein the AV functioning executing means
17 includes:

18 a search destination receiving unit for
19 generating, on receiving an instruction to execute the
20 search function from the operator, an interrupt request
21 specifying a search destination; and

22 a search function executing unit for instructing
23 the second controlling means to change a position of the
24 optical pickup to the search destination only when the
25 combination of flag values in the fetched playback type
26 information matches the combination of flag values in the
27 search condition table.

1 11. The disc reproduction apparatus of Claim 10, wherein
2 the combination of flag values in the search condition
3 table is one of a first case and a second case, wherein
4 in the first case, the first flag indicates that the
5 corresponding video title is retrieved according to only
6 one piece of route information, wherein in the second
7 case, the second flag indicates that the route
8 information of the corresponding video title does not
9 include any branch information.

1 12. The disc reproduction apparatus of Claim 11,
2 wherein the playback type information includes a
3 third flag which indicates whether all pieces of route

wherein the branch destination auto selection type is a type in which a default branch destination is specified when no branch destination has been selected by an operator,

wherein the combination of flag values in the search condition table is one of the first case, the second case, and a fifth case, wherein in the fifth case, the fourth flag indicates that all pieces of route information of the corresponding video title are of the branch destination auto selection type,

wherein the condition comparing unit compares the combination of flag values in the piece of playback type information fetched by the playback type information fetching unit with the combination of flag values in the search condition table.

14. The disc reproduction apparatus of Claim 10, wherein each of the plurality of pieces of video information includes a plurality of video blocks, wherein each of the plurality of video blocks includes video data and unit time management information, wherein the video data is compressed data of a certain unit time and the unit time management information controls a reproduction during the certain unit time,

wherein the title area includes an index number table including a plurality of index numbers and search destination information which indicates addresses of video blocks respectively corresponding to the plurality of index numbers, an index number table corresponds to a piece of route information,

wherein the search destination receiving unit, on receiving a numeral input by the operator as an index

4 are arranged in time series in an order of reproduction,
5 wherein each of the plurality of video blocks includes
6 video data and unit time management information, wherein
7 the video data is compressed data of a certain unit time
8 and the unit time management information controls a
9 reproduction during the certain unit time,

10 wherein the title area includes a plurality of
11 time map tables including information indicating a
12 relation between the plurality of video blocks and a
13 plurality of time codes,

14 wherein a time code is displayed by the disc
15 reproduction apparatus when a corresponding video block
16 is reproduced,

17 wherein the plurality of time map tables
18 correspond to a plurality of pieces of route information
19 of the first type and the second type,

20 wherein the search destination receiving unit
21 for, on receiving a numeral input by the operator as a
22 time code, referring to the time map table and
23 determining an address of a video block corresponding to
24 the input time code as the search destination,

25 wherein the search function executing unit
26 instructs the second controlling means to change a
27 position of the optical pickup to the search destination
28 only when the combination of flag values in the fetched
29 playback type information matches the combination of flag
30 values in the search condition table.

1 17. The disc reproduction apparatus of Claim 9, wherein
2 the judging means includes:

3 a feedback condition table storing unit for storing
4 a feedback condition table which includes a combination

5 of flag values, the combination of flag values being a
 6 condition under which the search function is executed;
 7 a playback type information fetching unit for
 8 fetching a piece of playback type information from the
 9 manager buffer corresponding to the video title selected
 10 by the operator; and

11 a condition comparing unit for comparing a
 12 combination of flag values in the piece of playback type
 13 information fetched by the playback type information
 14 fetching unit with the combination of flag values in the
 15 feedback condition table,

16 wherein the AV functioning executing means
 17 includes:

18 a monitoring unit for monitoring an amount of
 19 progress of the optical pickup which progresses under
 20 control of the second controlling unit;

21 a feedback function executing unit for generating
 22 display feedback information based on the amount of
 23 progress of the optical pickup monitored by the
 24 monitoring unit only when the combination of flag values
 25 in the fetched playback type information matches the
 26 combination of flag values in the feedback condition
 27 table; and

28 a displaying unit for displaying the display
 29 feedback information generated by the feedback function
 30 executing unit.

1 18. The disc reproduction apparatus of Claim 17, wherein
 2 the combination of flag values in the feedback
 3 condition table is one of a first case and a second case,
 4 wherein in the first case, the first flag indicates that
 5 the corresponding video title is retrieved according to a

6 piece of route information, wherein in the second case,
7 the second flag indicates that the route information of
8 the corresponding video title does not include the branch
9 information.

1 19. The disc reproduction apparatus of Claim 18,
2 wherein the playback type information includes a
3 third flag which indicates whether all pieces of route
4 information of a corresponding video title are of a
5 normal playback type,

6 wherein the normal playback type is a type in
7 which the plurality of pieces of video information
8 specified by the route information are sequentially
9 reproduced in a predetermined order,

10 wherein the combination of flag values in the
11 feedback condition table is one of a third case and a
12 fourth case, wherein in the third case, the third flag
13 indicates that all pieces of route information of the
14 corresponding video title are of the normal playback type
15 and the first flag indicates that the corresponding video
16 title is retrieved according to a piece of route
17 information, wherein in the second case, the third flag
18 indicates that all pieces of route information of the
19 corresponding video title are of a normal playback type
20 and the second flag indicates that the route information
21 of the corresponding video title does not include the
22 branch information,

23 wherein the condition comparing unit compares the
24 combination of flag values in the piece of playback type
25 information fetched by the playback type information
26 fetching unit with the combination of flag values in the
27 feedback condition table.

1 20. The disc reproduction apparatus of Claim 18,
2 wherein the playback type information includes a
3 fourth flag which indicates whether all pieces of route
4 information of a corresponding video title are of a
5 branch destination auto selection type,

6 wherein the branch destination auto selection
7 type is a type in which a default branch destination is
8 specified when no branch destination has been selected by
9 an operator,

10 wherein the combination of flag values in the
11 feedback condition table is one of the first case, the
12 second case, and a fifth case,

13 wherein in the fifth case, the fourth flag
14 indicates that all pieces of route information of the
15 corresponding video title are of the branch destination
16 auto selection type,

17 wherein the condition comparing unit compares the
18 combination of flag values in the piece of playback type
19 information fetched by the playback type information
20 fetching unit with the combination of flag values in the
21 feedback condition table.

1 21. The disc reproduction apparatus of Claim 17,

2 wherein each of the plurality of pieces of video
3 information includes a plurality of video blocks, wherein
4 each of the plurality of video blocks includes video data
5 and unit time management information, wherein the video
6 data is compressed data of a certain unit time and the
7 unit time management information controls a reproduction
8 during the certain unit time,

9 wherein the title area includes an index number
10 table including a plurality of index numbers and search

11 destination information which indicates addresses of
12 video blocks respectively corresponding to the plurality
13 of index numbers, wherein the index number table
14 corresponds to a piece of route information,
15 wherein the monitoring unit monitors an address
16 of a video block read by the optical pickup and refers to
17 the index number table to determine an index number which
18 corresponds to the monitored address,
19 wherein the feedback function executing unit generates
20 the display feedback information based on the index
21 number determined by the monitoring unit only when the
22 combination of flag values in the fetched playback type
23 information matches the combination of flag values in the
24 feedback condition table,
25 wherein the displaying unit displays the display
26 feedback information generated by the feedback function
27 executing unit.

1 22. The disc reproduction apparatus of Claim 21,
2 wherein each of the plurality of video titles in the
3 optical disc has an identification number,

4 wherein the monitoring unit further monitors the
5 identification number of a video title read by the
6 optical pickup,

7 wherein the feedback function executing unit
8 generates the display feedback information based on the
9 identification number of the video title monitored by the
10 monitoring unit and the index number determined by the
11 monitoring unit when the combination of flag values in
12 the fetched playback type information matches the
13 combination of flag values in the feedback condition
14 table, wherein the feedback function executing unit

15 generates the display feedback information based on only
16 the identification number of the video title monitored by
17 the monitoring unit when the combination of flag values
18 in the fetched playback type information does not match
19 the combination of flag values in the feedback condition
20 table,

21 wherein the displaying unit displays the display
22 feedback information generated by the feedback function
23 executing unit.

1 23. The disc reproduction apparatus of Claim 17,

2 wherein each of the plurality of pieces of video
3 information includes a plurality of video blocks which
4 are arranged in time series in an order of reproduction,

5 wherein each of the plurality of video blocks
6 includes video data and unit time management information,
7 wherein the video data is compressed data of a certain
8 unit time and the unit time management information
9 controls a reproduction during the certain unit time,

10 wherein the optical disc includes a time map
11 table including information indicating a relation between
12 the plurality of video blocks and a plurality of time
13 codes,

14 wherein a time code is displayed by the disc
15 reproduction apparatus when a corresponding video block
16 is reproduced,

17 wherein the feedback function executing unit
18 includes:

19 an initial time code displaying unit for
20 displaying an initial time code with a certain format
21 when the second controlling means starts reading the
22 video title;

23 a progress monitoring unit for monitoring a video
24 block read by the optical pickup; and

25 a time code updating unit for displaying a time
26 code corresponding to the video block monitored by the
27 progress monitoring unit by referring to the time map
28 table, wherein the time code updating unit updates the
29 initial time code first and continues to update as
30 reading of data by the optical pickup progresses.

1 24. The disc reproduction apparatus of Claim 23,
2 wherein each of the plurality of video titles in the
3 optical disc has an identification number,

4 wherein the monitoring unit further monitors the
5 identification number of a video title read by the
6 optical pickup,

7 wherein the feedback function executing unit
8 generates the display feedback information based on the
9 identification number of the video title monitored by the
10 monitoring unit and one of the initial time code and the
11 time code displayed by the time code updating unit when
12 the combination of flag values in the fetched playback
13 type information matches the combination of flag values
14 in the feedback condition table,

15 wherein the feedback function executing unit
16 generates the display feedback information based on only
17 the identification number of the video title monitored by
18 the monitoring unit when the combination of flag values
19 in the fetched playback type information does not match
20 the combination of flag values in the feedback condition
21 table,

22 wherein the displaying unit displays the display
23 feedback information generated by the feedback function
24 executing unit.

1 25. The disc reproduction apparatus of Claim 9, wherein
2 the playback type information includes a fourth
3 flag which indicates whether all pieces of route
4 information of a corresponding video title are of a
5 branch-in-title type,

6 wherein the branch-in-title type is a type in
7 which a current video title does not branch to another
8 video title,

9 wherein the disc reproduction apparatus further
10 comprises:

11 program start instruction receiving means for
12 receiving from the operator a notification of inputting a
13 plurality of index numbers for a programmed reproduction;

14 title number receiving means for receiving a
15 numeral input by the operator as a title number;

16 branch judging means for, every time the title
17 number receiving means receives a title number, judging
18 whether a video title corresponding to the title number
19 received by the title number receiving means branches to
20 another video title by referring to flags in the playback
21 type information of the video title;

22 holding means for holding a set of video title
23 numbers corresponding to video titles judged by the
24 branch judging means as not branching to another video
25 title; and

26 programmed reproduction executing means for
27 activating the calculating means and the second
28 controlling means as many times as the number of the

29 video title numbers in the set of video title numbers so
30 that the video titles corresponding to the video title
31 numbers in the set of video title numbers are read in
32 sequence.

1 26. A method, applied to a disc reproduction apparatus
2 including a buffer, of reproducing an optical disc, the
3 optical disc comprising a plurality of video titles, a
4 plurality of pieces of management information, and a
5 plurality of pieces of playback type information, wherein
6 each of the plurality of video titles includes route
7 information and a plurality of pieces of video
8 information retrieved according to the route information,
9 wherein each of the plurality of pieces of management
10 information manages an address of a corresponding video
11 title, wherein each of the plurality of video titles is a
12 video production, wherein each of the plurality of pieces
13 of playback type information includes a first flag and a
14 second flag, wherein the first flag indicates whether a
15 corresponding video title is retrieved according to a
16 piece of route information or according to a plurality of
17 pieces of route information, and the second flag
18 indicates whether the route information of the
19 corresponding video title includes the branch
20 information, the method comprising:

21 a first writing step of writing a piece of
22 management information into the buffer;

23 a first receiving step of receiving a video title
24 selected by an operator to be reproduced;

25 a calculating step of calculating an address of
26 the video title selected by the operator by referring to
27 the buffer;

28 a second controlling step of reading the video
29 title from a position specified by the address calculated
30 by the calculating step;

31 a judging step of judging whether AV functioning
32 can be executed in the video title read in the second
33 controlling step by referring to the first flag and the
34 second flag corresponding to the video title, wherein the
35 AV functioning at least includes a search function for
36 allowing the disc reproduction apparatus to search and
37 reproduce an arbitrary portion of the video title and a
38 feedback function for allowing the disc reproduction
39 apparatus to monitor and display a reproduction elapsed
40 time; and

41 an AV functioning executing step of executing the
42 AV functioning only when the judging step judges that the
43 AV functioning can be used in the video title.